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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,282	08/27/2003	Guo Liu	SMBZ 2 01002	5488
27885	7590	03/31/2006	EXAMINER	
FAY, SHARPE, FAGAN, MINNICH & MCKEE, LLP 1100 SUPERIOR AVENUE, SEVENTH FLOOR CLEVELAND, OH 44114			THOMPSON, CAMIE S	
			ART UNIT	PAPER NUMBER
			1774	

DATE MAILED: 03/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/649,282	<b>Applicant(s)</b> LIU ET AL.	
	<b>Examiner</b> Camie S. Thompson	<b>Art Unit</b> 1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on Amendment filed 1/20/06.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 3-44 is/are pending in the application.
- 4a) Of the above claim(s) 32-41 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21-31 and 42-44 is/are allowed.
- 6) ☒ Claim(s) 1,3,4 and 11-20 is/are rejected.
- 7) ☒ Claim(s) 5-10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. Applicant's amendment and accompanying remarks filed January 20, 2006 have been acknowledged.
2. Examiner acknowledges amended claims 1, 3 and 10.
3. Examiner acknowledges cancelled claim 2.
4. The rejection of claims 1-4, 6 and 8-9 under 35 U.S.C. 102(b) as being anticipated by Hampden-Smith et al., U.S. Patent Number 5,837,320 is withdrawn due to applicant's amended claim 1 and argument.
5. The rejection of claims 1 and 7 under 35 U.S.C. 103(a) as being unpatentable over Hampden-Smith et al., U.S. Patent Number 5,837,320 is withdrawn due to applicant's argument.
6. The rejection of claims 1-6, 8-10 and 12 under statutory double patenting as being the same invention is withdrawn due to applicant's argument and the removal of the same subject matter in application 10/736,020.

### *Claim Rejections - 35 USC § 112*

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 11-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear as to claim 11 is drawn to the phosphor of claim 8 from which it depends or the electroluminescent device in which the phosphor is located. Claim 11 is drawn to a phosphor and not the device (the preamble).

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1 and 3-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Justus et al., U.S. Patent Number 5,656,815.

Justus discloses an inorganic phosphor such as zinc sulfide doped with a lanthanide metal such as europium (see column 2, line 64-column 3, line 5). Additionally, the reference discloses that the phosphor has a crystal grain size dimension of less than 500 angstroms (see column 2, lines 54-68).

11. Claims 5-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not provide for the recited improved phosphor, further including the phosphor being provided within an electroluminescent device as a thin film with a thickness of about 0.5 to 1.0 micron wherein the zinc sulfide phosphor has a sphalerite crystal structure.

12. Claims 21-31 and 42-44 are allowed. The prior art does not provide for a thick film dielectric electroluminescent device comprising:

a thin phosphor layer of formula ZnS:Re, wherein said phosphor layer has a crystal grain size of up to about 50 nm and Re is selected from terbium and europium; and

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a structure and/or substance to minimize or prevent reaction of the fine grained phosphor with oxygen, wherein said structure or substance comprises one or more of;

i) interface modifying layers on one or both sides of the phosphor film to improve the stability of the interface between the phosphor and the rest of the device;

ii) a hermetic enclosure for the electroluminescent device; and

iii) an oxygen getter incorporated into the device.

Additionally, the prior art does not provide for a thick film dielectric electroluminescent device comprising:

A 0.5 to 1.0  $\mu\text{m}$  thick phosphor layer of formula  $\text{ZnS:Re}$ , wherein said phosphor layer has a sphalerite crystal structure with a crystal grain size of up to about 50 nm and Re is selected from terbium or europium; and

i) interface modifying layers on one or both sides of the phosphor film to improve the stability of the interface between the phosphor film and the rest of the device, wherein said interface modifying layers are comprised of pure zinc sulfide or silicon nitride.

### ***Response to Arguments***


13. Applicant's arguments with respect to the instant claims have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Camie S. Thompson whose telephone number is (571) 272-1530. The examiner can normally be reached on Monday through Friday from 7:30 am to 4:00 pm. If

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attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena L Dye, can be reached at (571) 272-3186. The fax phone number for the Group is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
RENA DYE  
SUPERVISORY PATENT EXAMINER

A.U. 1774 3/29/06